



FAA-D-2494/b
March 14, 1984
~~SUPERCEDING~~
FAA-D-2494/1a
/2
/3
/4

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
SPECIFICATION**

TECHNICAL INSTRUCTION BOOK MANUSCRIPT: ELECTRONIC, ELECTRICAL,
AND MECHANICAL EQUIPMENT, REQUIREMENTS FOR PREPARATION OF
MANUSCRIPT AND PRODUCTION OF BOOKS

Attachment J.13, FAA Order FAA-D-2494/b, is a 134 page document. Only the cover sheet and index are attached to this SIR/RFP. If a vendor is required to develop a technical instruction manual, as part of an installation Task Order, a compact disk containing the entire document will accompany the Task Order. This document is only needed where custom built electrical or mechanical equipment is installed as directed by the Government. All Government Furnished Equipment (GFE) and Commercial-Off the Shelf (COTS) equipment come with either Government produced Technical Instruction manuals or factory operation and maintenance manuals.

TABLE OF CONTENTS

Paragraph	Title	Page
1.	Scope	1
1.1	General	1
1.1.1	New equipment	1
1.1.2	Commercial publications	1
1.2	Responsibility	2
1.3	Precedence of requirements	2
2.	Applicable documents	2
2.1	FAA documents	2
2.2	Military documents	2
2.3	Other Government publications	3
2.4	American National Standards Institute (ANSI) publications	3
2.5	Institute of Electrical and Electronics Engineers (IEEE)	3
3.	Requirements	4
3.1	General requirements	4
3.1.1	Writing level	4
3.1.2	Grammatical person and mood	5
3.1.3	Use of directive verbs	5
3.1.4	Nomenclature consistency	5
3.1.5	Development of text	6
3.1.6	Warnings, cautions, and notes	6
3.1.7	Tables	7
3.1.7.1	Uses of tables	7
3.1.7.2	Rules for tables	8
3.1.7.3	Table format	8
3.1.7.4	Numbering and titling of tables	8
3.2	Manuscript plan	8
3.2.1	Prospectus	8
3.2.2	Manuscript schedule	9
3.2.2.1	Manuscript review schedule	9
3.2.2.2	Manuscript validation schedule	9
3.2.3	Verification and validation plan	9
3.3	Manuscripts	11
3.3.1	Draft manuscripts	11
3.3.1.1	In-process reviews	11
3.3.1.2	Typing and format requirements for draft copies	11
3.3.1.2.1	Typing equipment	11
3.3.1.2.2	Paragraph numbering	12
3.3.1.2.3	Paragraph headings	12
3.3.1.2.4	Page numbering	12
3.3.1.3	Draft artwork	12
3.3.2	Final manuscript	12
3.3.2.1	Typing and format requirements for reproducible copy	15
3.3.2.1.1	Machine printouts	15
3.3.2.1.2	Publication number	15
3.3.2.1.3	Publication date	16

Paragraph	Title	Page
3.3.2.2	Final artwork	16
3.3.2.2.1	Original used in preparation of illustrations	16
3.3.2.2.2	Overlays on artwork	16
3.3.2.2.3	Covering of artwork	16
3.3.2.2.4	Troubleshooting support data format	16
3.3.2.3	Suggested improvements form	16
3.4	Reference designations, symbols, and abbreviations	20
3.4.1	Reference designations	20
3.4.2	Letter symbols for semiconductor devices	20
3.4.3	Letter symbols and mathematical signs	20
3.4.4	Graphic symbols for circuit elements	20
3.4.5	Mechanical diagram symbols	20
3.4.6	Flow chart symbols	20
3.4.7	Logic diagram symbols	21
3.4.8	Designation for switch gear and industrial control devices	21
3.4.9	Special symbols	21
3.4.10	Acronyms and other abbreviations	21
3.5	Security classification marking	21
3.6	Arrangement of manuscript contents	21
3.6.1	Front cover	21
3.6.1.1	Front cover content	21
3.6.1.2	Cover stock	24
3.6.2	Contractor guarantee	24
3.6.3	List of modifications to specifications	24
3.6.4	List of effective pages	24
3.6.5	Content assurance page	24
3.6.6	Table of contents	26
3.6.7	List of illustrations	26
3.6.8	List of tables	26
3.6.9	Family tree chart	26
3.6.10	Section 1 of instruction book, general information and requirements	28
3.6.10.1	Introduction	28
3.6.10.2	Equipment description	28
3.6.10.3	Relationship of units	28
3.6.10.4	Equipment specification data	28
3.6.10.4.1	Nameplate data	30
3.6.10.4.2	Functional characteristics	30
3.6.10.4.3	External power requirements	30
3.6.10.4.4	Rated output	30
3.6.10.4.5	Environmental characteristics	30
3.6.10.5	Equipment and accessories supplied	30
3.6.10.6	Equipment required but not supplied	30

Paragraph	Title	Page
3.6.11	Section 2 of instruction book, technical description	31
3.6.11.1	Simplified theory of operation	31
3.6.11.2	Detailed theory of operation	31
3.6.11.2.1	Equivalent circuits	32
3.6.11.2.2	Timing diagrams	32
3.6.11.2.3	Logic circuits	32
3.6.11.2.4	Mechanical functions	36
3.6.12	Section 3 of instruction book, operation	36
3.6.12.1	Controls and indicators	36
3.6.12.2	Turn-on-and checkout	36
3.6.12.3	Remote monitoring and control	36
3.6.12.4	Equipment shutdown	36
3.6.13	Section 4 of instruction book, standards and tolerances	39
3.6.13.1	Parameter	39
3.6.13.2	Procedure paragraph reference	39
3.6.13.3	Standard	39
3.6.13.4	Initial tolerance limit	39
3.6.13.5	Operating tolerance limit	39
3.6.13.6	Interconnecting cables and circuits	39
3.6.13.7	Remote monitor and alarms	39
3.6.14	Section 5 of instruction book, periodic maintenance	41
3.6.14.1	Tabular presentation	41
3.6.14.2	Performance checks	41
3.6.14.3	Other onsite maintenance	41
3.6.14.4	Offsite maintenance	41
3.6.15	Section 6 of instruction book, maintenance procedures	43
3.6.15.1	Content	43
3.6.15.2	Format	43
3.6.15.3	Performance check procedures	43
3.6.15.4	Other maintenance procedures	43
3.6.15.5	Special maintenance procedures	43
3.6.16	Section 7 of instruction book, corrective maintenance	44
3.6.16.1	Onsite corrective maintenance	44
3.6.16.2	Offsite repair	44
3.6.16.3	Test equipment	44
3.6.16.4	Overhaul, maintenance, and repair standards	44
3.6.16.5	Packing instructions	45
3.6.17	Section 8 of instruction book, parts list	46
3.6.17.1	Parts list format	46
3.6.17.2	Use of latest JAN/MIL designations	48
3.6.17.3	Design change incorporation	48
3.6.17.4	Electrical parts	48

Paragraph	Title	Page
3.6.17.5	Mechanical data	52
3.6.17.6	Transformer size data	52
3.6.17.7	Lubrication data	52
3.6.17.8	Indicating fuse holder	53
3.6.17.9	Indicator lights	53
3.6.17.10	Tube sockets	53
3.6.17.11	Listing of plug-in modules or printed wiring circuits	53
3.6.17.12	List of manufacturers	53
3.6.18	Section 9 of instruction book, installation, integration, and checkout	54
3.6.18.1	Site information	54
3.6.18.2	Installation drawings	55
3.6.18.3	Unpacking and repacking	55
3.6.18.4	Input requirement summary	55
3.6.18.5	Installation procedures	55
3.6.18.6	Inspection	55
3.6.18.7	Initial startup and preliminary testing . . .	56
3.6.18.8	Installation verification test	56
3.6.19	Section 10 of instruction book, computer software	57
3.6.19.1	Program hierarchy	57
3.6.19.2	Program descriptions	57
3.6.19.2.1	Program purpose	57
3.6.19.2.2	Program capacity	57
3.6.19.2.3	Interface	57
3.6.19.2.4	Program input data	58
3.6.19.2.5	Program output data	58
3.6.19.2.6	Database descriptions	58
3.6.19.2.7	Program documentation	58
3.6.19.3	Listings	58
3.6.19.3.1	Program listings	58
3.6.19.3.2	Cross-reference listings	59
3.6.19.3.3	Load maps	59
3.6.20	Section 11 of instruction book, troubleshooting support data	60
3.6.20.1	Method of presentation	60
3.6.20.1.1	Contractor's commercial publications	60
3.6.20.1.2	Standard (8-1/2 by 11-inch) binding	60
3.6.20.1.3	Separate oversize (11- by 17-inch) binding .	60
3.6.20.2	Legibility	61
3.6.20.3	Numbering and titling	61
3.6.20.4	Size of illustrations	61
3.6.20.5	Block diagrams	63
3.6.20.6	Major function diagram	63
3.6.20.7	Schematic diagrams	63
3.6.20.7.1	Diagrams for analog equipment	65
3.6.20.7.2	Diagrams for functional entities	65
3.6.20.8	Functional circuits	65
3.6.20.9	Nomenclature and reference designations . .	66
3.6.20.10	Discrete circuit element data	66
3.6.20.11	Identification of adjustments and controls .	66
3.6.20.12	Test points	66
3.6.20.13	Photographs	66
3.6.20.14	Continuous-tone illustrations	67

Paragraph	Title	Page
3.6.20.15	Printed circuit board illustrations	67
3.6.20.16	Callouts	67
3.6.20.17	Leader lines	69
3.6.20.18	Power distribution diagram	69
3.6.20.19	Wiring diagrams	69
3.6.20.20	Cabling diagrams	69
3.6.20.21	Mechanical drawings	69
3.6.20.22	Piping diagram	69
4.	Quality assurance provisions	70
4.1	Responsibility for inspection	70
4.1.1	Contractor inspection	70
4.1.2	Inspection of artwork	70
4.1.3	Proofreading	70
4.1.4	Completeness and continuity	70
4.1.5	Assembly instructions	70
4.2	Quality program requirements	71
4.2.1	Personnel	71
4.2.2	Coordination	71
4.3	Validation	71
4.4	Validation of changes	72
4.5	Verification	72
4.6	Government inspection	72
5.	Preparation for delivery	72
5.1	Packaging of reproducible (camera-ready) copy	72
5.2	Packaging of original artwork	72
5.3	Printing instructions	72
5.3.1	Page size	72
5.3.2	Paper stock	73
5.3.3	Negatives	73
5.3.4	Printing	73
5.3.5	Drilling	73
5.4	Binding	73
5.5	Review and acceptance of printed books	74
5.6	Packaging of books for delivery	74
	Summary of Definitions	103
	Acronyms and Abbreviations	105

LIST OF FIGURES

Title	Page	
Figure 1	Manuscript schedule	10
Figure 2	Right-hand page format	13
Figure 3	Left-hand page format	14
Figure 4	Identification, marking, and cover for artwork	17
Figure 5	Typical front cover, troubleshooting support data volume	18
Figure 6	Suggested improvements to equipment instruction book	19
Figure 7	Typical front cover	23
Figure 8	Content assurance page	25
Figure 9	Family tree chart	27
Figure 10	Relationship of units	29
Figure 11	Functional flow diagram	75
Figure 12	Signal flow diagram	77
Figure 13	Logic circuit diagram	33
Figure 14	Integrated circuit logic diagrams	34
Figure 15	Integrated circuit data center	79
Figure 16	Machine logic diagram	35
Figure 17	Intermediate logic diagram	81
Figure 18	Controls and indicators presentation	37
Figure 19	Sample turn-on and checkout tabular format	38
Figure 20	Example of standards and tolerances table	40
Figure 21	Signal flow diagram	42 & 83
Figure 22	Parts list format	47
Figure 23	Oversize sheet dimensions	62
Figure 24	Foldout page dimensions	64
Figure 25	Sample block diagram of chassis with plug-in units	85
Figure 26	Sample chassis schematic diagram	87
Figure 27	Sample schematic breakdown to component level showing IF amplifier	89
Figure 28	Printed circuit board	91
Figure 29	Use of leader lines for callouts	68
Figure 30	Power distribution diagram (sheet 1 of 2)	93
Figure 30	Power distribution diagram (sheet 2 of 2)	94
Figure 31	Sample wiring diagram	97
Figure 32	Mechanical schematic	99
Figure 33	Piping diagram	101
	Appendix 1 - Commercial Instruction Books	
	Index	